Entrepreneurship, Small Businesses, and Urban Growth

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Abstract

Entrepreneurship is widely believed to be a main source of economic growth. This paper's objective is threefold: (1) to estimate the impact of entrepreneurship measured by the birth of businesses on urban employment and income growth; (2) to examine how entrepreneurship supported by government guaranteed loans compares with market entrepreneurship regarding its impact on urban growth; and (3) to examine whether market and government-backed entrepreneurship are complements or substitutes. The study of entrepreneurship and urban growth is hampered by the joint determination of the two. I use the variation in entrepreneurship generated by the homestead exemption levels in state bankruptcy laws in 1975 to examine urban growth between 1993 and 2002. I find that a ten percent increase in the birth of small businesses increases MSA employment by 1 to 1.5% and income by 2.5 to 3.5% after ten years. I next examine whether the federal Small Business Loan program that guarantees loans to entrepreneurs that were unable to finance through the market generates urban growth. I find no growth impact from government-backed entrepreneurship and further find that government-backed entrepreneurship crowds out market entrepreneurship one for one. Nonetheless, a complete assessment of government-backed entrepreneurship requires further examination of equity concerns, such as potential discrimination in small business lending.

Keywords: Entrepreneurship, Personal Bankruptcy Law, Small Businesses Loans, Urban Economic Growth

JEL Codes: L26, G18, K35, O18, R11

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1. Introduction

Entrepreneurship is widely believed to be a main source of economic growth. Entrepreneurs that succeed and contribute to the local economy become the spotlight of local media. Politicians and business advocates emphasize the role small businesses play in adding new jobs, and small businesses are a frequent topic in presidential debates. Furthermore, the U.S. has actively promoted and supported small businesses since the establishment of the Small Business Administration in 1953. Employment statistics are often used to support the importance of entrepreneurship and small businesses in adding jobs in the economy.[1] However, while there are successful entrepreneurs, businesses also fail. According to the Bureau of Labor Statistics, only a third of all new establishments survive after 10 years. As important understanding entrepreneurship's contribution to economic growth may seem, we have surprisingly little empirical evidence on whether or not entrepreneurship promotes economic growth and if so by how much.

This paper's objective is threefold: (1) to estimate the impact of entrepreneurship measured by the birth of small establishments on urban employment and income growth; (2) to examine how entrepreneurship supported by government guaranteed loans compare with market entrepreneurship in terms of its impact on urban growth; and (3) to examine whether government guaranteed entrepreneurship crowds out market entrepreneurship. Overall, the paper will provide estimated magnitudes of the importance of entrepreneurship and shed light on policy's role in the promotion of entrepreneurship.

The extensiveness of the data required to examine business dynamics had been one of the main impediments in furthering our understanding of the relationship between individual business size and growth. However, recent research has made substantial improvements. Haltwinger et al. (2013), using the Census Longitudinal Business Dynamics data, examine the universe of all firms and establishments in the US and find that once firm age is controlled for smaller businesses grow no faster than larger businesses. They find that the main source of employment growth is attributed to small and young businesses. Neumark et al. (2011) also find similar results using the National Establishment Time Series data. Even though only a subset of

[1] Kleisen and Maues (2011) find that between 1992 and 2010 small firms with 1 to 19 employees provided about 30 percent of the gross new jobs in the economy, which is the largest percentage among the different firm size categories. However those small firms accounted for only 16 percent of the net new jobs, the smallest percentage among the different firm size categories. The Small Business Administration uses the 500 employees cut off and report that small businesses account for 64% of net new jobs.

new small businesses survives, small businesses significantly contribute to the creation of jobs. These findings shed light on the importance of new small businesses. However, the implications of these studies are somewhat limited in its focus on average year to year growth. Given that many small firms die out and economic growth is assessed on intervals longer than one year, I focus on the impact of entrepreneurship after 5 or 10 years. Also, rather than focusing on individual businesses, I examine the impact of entrepreneurship on the aggregate economy, i.e., the metropolitan area. Focusing on the urban economy can capture any potential externality benefits that may arise from entrepreneurship.

The focus on the aggregate impact of potential entrepreneurship is similar in spirit to Samila and Sorenson (2011), who examine the impact of venture capital on entrepreneurship and growth at the MSA level. Recent literature in urban economics have empirically estimated the agglomeration benefits of cities (Greenstone et al. 2010, Henderson et al. 1995, Glaeser et al. 1992) and in the case of Rosenthal and Strange (2003), the agglomeration benefits to firm birth. This paper differs with most of the entrepreneurship and urban economics literature in that entrepreneurship is a right hand side variable, unlike most of the literature where entrepreneurship is examined as an outcome. This illustrates the fundamental challenge. The difficulty in estimating the impact of entrepreneurship on economic growth is the joint determination of the two and finding a plausibly exogenous variation in entrepreneurship remains a challenge in the literature. One recent development has been the study by Glaeser et al. (2012). They use proximity to mines in 1900 as instruments for average establishment size and find that cities with smaller average establishment size have higher employment growth.

This paper uses a direct measure of entrepreneurship, business births, and examines its impact on urban employment and income growth. In order to generate a plausibly exogenous variation of entrepreneurship, I use the homestead exemption levels set by state bankruptcy laws in 1975 as instrumental variables. States varied substantially in the degree to which debtors could avoid paying creditors back and such variation dates back to the nineteenth century. Posner et al. (2001) point out that the variation in the state's desire to promote migration in the 19th century and the legislative negotiation process, where negotiation starts based on initial exemption levels, caused state exemption levels to persist over a long period of time.

I find that cities with unlimited or higher exemption levels in 1975 see higher business births in 1993. Using this variation I find that a ten percent increase in entrepreneurship increases

urban employment by 1 to 1.5% and urban income by 2.5 to 3.5% after ten years. The IV and first-difference estimates are smaller than the OLS estimates, which confirms the main identification concern that the potential for economic growth in cities generates entrepreneurial activity in those cities.

For every 100 businesses that are created in the private market there is one business created through government guaranteed loans. The Small Business Administration provides guaranteed loans to entrepreneurs who could not secure loans from the private market. I examine how these government-backed businesses impact urban employment and income growth. Using the universe of the Small Business Loan (SBL) data I aggregate all loan approvals to the MSA year level and generate the number of new loan approvals and the total approved amount. Examining the impact of government-backed entrepreneurship on urban growth in an OLS framework suffers from the endogeneity problem as before. Cities with higher growth potential may see more SBA loan applications and approval. On the contrary, cities that were declining with more people being laid off may see higher SBA loan applications and approval. In order to generate plausibly exogenous variation in SBA backed entrepreneurship, I use years since interstate banking deregulation and the number of SBA lender per capita in 1985 as instrumental variables. The banking sector was heavily deregulated during most of the 20^{th} century. Gradually, each state allowed banks to operate across state borders. The new competition generated by multiple banks would provide more opportunities for personal and business finance. I find that metropolitan areas that deregulated earlier see more market entrepreneurial activity and less need to go through the SBA to finance a business in 1993. Cities with higher density of SBA lenders in 1985 would see more competition among SBA lenders which could facilitate capital constrained potential entrepreneurs. I indeed find that higher density of SBA lenders in 1985 increase SBA backed entrepreneurship in 1993. In addition to these set of instruments, I also use the set of homestead exemption levels as instruments. Whichever set of instruments I use I find no impact of government-backed entrepreneurship on urban employment or income growth.

To further assess the role of government-backed entrepreneurship on urban growth, I examine whether government-backed entrepreneurship complements market entrepreneurship or crowds out market entrepreneurship. The cross-sectional variation initially indicates that the two are complements in entrepreneurial activity. However, when I examine within metropolitan areas over time I find statistically significant impact of crowd out. The impact is strong. For one

government-backed entrepreneurship there is one less market entrepreneurship. The one for one crowd out and the fact that market entrepreneurship contributes to urban economic growth but that government-backed entrepreneurship does not, suggests that there is efficiency loss through government's involvement in promoting entrepreneurship.

The paper proceeds as follows. Section 2 discusses the theory that guides the empirical work. Section 3 discusses the data and variables used in the analysis. Section 4 examines the impact of entrepreneurship on urban growth. Section 5 compares the impact of government-backed entrepreneurship and market entrepreneurship. Section 6 concludes.

2. A Simple Theory of Entrepreneurship and Urban Growth

I introduce entrepreneurship to a standard model of urban growth (Glaeser et al. 1992, Henderson et al. 1995) to guide the empirical work. Consider a representative firm in a city at time *t* where production is specified as $f(L_t) = A_t L_t^{\alpha},\ 0 < \alpha < 1$. A_t represents the level of technology and L_t the level of labor input at time *t*. The model abstracts away from other factors of production such as, capital and land, and hence will not be able to capture change in wage or employment due to labor substituting technological advances. I note that city subscripts are dropped in the description of the model for expositional brevity. Within this stylized framework, labor is paid the value of marginal product where output price is normalized to one, returning the labor demand function $w_t = f'(L_t) = \alpha A_t L_t^{\alpha-1}$. Putting this in a dynamic framework the growth of employment in a city can be represented as

$$(1-\alpha)\Delta \ln L_t = \Delta \ln A_t - \Delta \ln w_t \quad (1)$$

where $\Delta \ln L_t = \ln L_{t+1} - \ln L_t$, and similarly for the other variables. I specify the growth of the technology as:

$$\Delta \ln A_t = \ln A_{t+1} - \ln A_t = g(e_t, N_t, ini_t, \rho) \qquad (2)$$

where I define e_t as the aggregate entrepreneurship in the city at time *t*. Note that e_t is the *aggregate* entrepreneurial level and hence is impacted by the *number* of entrepreneurial activity as well as the *average* entrepreneurial ability of entrepreneurs in the city. N_t is the size of the city measured by population capturing traditional agglomeration externalities, and ini_t represents initial economic condition that might explain growth of technology in the city, such as, initial employment, cost of living, and education level. ρ is the national growth rate of technology that is constant across cities.

I assume an upward sloping labor supply curve $w(L) = w_0 L^{\sigma}$, $\sigma > 0$. The upward sloping labor supply relaxes the perfect labor mobility and the cross-city wage equalization assumptions often used in the literature and allows workers to have preferences for cities. Hence, wage growth is no longer constant at the national level but can vary across cities. Incorporating labor supply into (1) and (2) returns the reduced form equations:

$$\Delta \ln L_t = L(e_t, N_t, L_t, w_t, ini_t)$$
$$\Delta \ln w_t = w(e_t, N_t, L_t, w_t, ini_t) \qquad (3)$$

The main empirical test will be to examine whether entrepreneurship indeed promotes the growth of city employment and wages, i.e., whether

$$\partial \Delta \ln L_t / \partial e_t > 0 \text{ and } \partial \Delta \ln w_t / \partial e_t > 0.$$

In practice, I run regressions following the model:

$$\Delta \ln Y_{i,1993-2002} = \beta \ln e_{i,1993} + \ln X_{i,1993} \cdot \gamma + \delta_d + \varepsilon_i \qquad (4)$$

for Metropolitan Statistical Areas (MSAs) in the United States for the years 1993 to 2002. I examine this ten year period primarily because the census definition of MSAs often change after each census cycle. By limiting my analysis to these years I am able to maintain a consistent geography for MSAs and examine the growth dynamics of cities in a consistent manner. *Y* denotes the dependent variable (employment or income) so that $\Delta \ln Y_{i,1993-2002}$ is the change in log employment or income between 1993 and 2002 for city *i*. $\ln X_{i,1993}$ is the vector of log control variables, which include initial number of establishments, initial employment, initial payroll, and population in 1993. δ_d is the set of census division dummy variables. $\ln e_{i,1993}$ is the log entrepreneurship measured by the birth of new businesses for city *i* in 1993.

A discussion of what this paper refers to entrepreneurship in an MSA is warranted at this point. First, the terms *firm*, *establishment*, and *business* need clarification. As Neumark et al. (2011) point out, a *firm* is identified by a common owner and can own multiple *establishments*, and a *business* generally refers to either a *firm* or an *establishment*. A large firm opening a branch, e.g., Walmart opening a new branch in town, would show up as a new establishment in the data but we would not considered such expansion as entrepreneurship. An entrepreneur that starts a new business would appear as a new firm as well as a new establishment in the data. Hence, firm birth would be an ideal proxy. However, for firms, especially multi-establishment firms, the relation between geography and economic measures (employment, payroll) is more

obscure, whereas for establishments, there is always a one to one matching between location and employment (or payroll). Hence, a common proxy used to measure entrepreneurship over a fixed geography (MSA or county) is average establishment size over that geography (Glaeser et al. 2010, 2012). Since most entrepreneurship is associated with small businesses, average establishment size serves as a reasonable proxy for entrepreneurship and the establishment level data links economic activity of businesses to a location in a straightforward way. One concern could be that average establishment size could contain other information, i.e., the degree of competition in an area. A more direct measure of entrepreneurship, the birth of businesses, has also been used in the literature but as an outcome variable rather than a right hand side variable (Rosenthal and Strange 2003, Samila and Sorenson 2011). This paper will use birth of businesses in a metropolitan area as the main measure of entrepreneurship but as a covariate of interest.

A fundamental difficulty in retrieving an unbiased estimate of β in equation (4) is the joint determination of urban entrepreneurial activity and urban economic growth. Cities with potentials for growth will likely see higher levels of entrepreneurial activity, which would render the estimate of β upward biased in equation (4). The challenge of generating a plausibly exogenous variation of entrepreneurship has hampered the development of the causal investigation of the impact of entrepreneurship on economic growth. I am not aware of any other paper that have attempted to examine this causal relationship other than Glaeser et al (2012). This paper adds to this literature by using a different source of exogenous variation for urban entrepreneurial activity. I defer the discussion of my instrumental variable to the next section.

Another margin of entrepreneurship I am interested in is the underlying variation in entrepreneurial ability that is *relevant for growth.* Entrepreneurial ability would encompass various facets ranging from one's knowledge of the business and legal environment, communication skills, personnel and time management, to leadership. The main question I am interested in is how entrepreneurial ability differs between market and government-backed entrepreneurship. The rationale for government intervention in promoting entrepreneurship is market imperfection, that because of imperfect information concerning the ability of entrepreneurs and risk aversion in part from the lenders, the market is inefficiently allocating resources to entrepreneurs of differing abilities. Potential discrimination in the lending market is another argument for government intervention in small business lending. I do not examine the sources of market imperfection in this paper, but rather examine aggregate economic outcomes

and based on such results infer the average entrepreneurial ability of government-backed entrepreneurs. In order to examine this margin, I separate out entrepreneurship that were financed through government guarantee on loans to those that were financed in the private market. In practice, I run regressions following the model:

$$\Delta \ln Y_{i,1993-2002} = \beta_1 \ln mrktent_{i,1993} + \beta_2 \ln govtent_{i,1993} + \ln X_{i,1993} \cdot \gamma + \delta_d + \varepsilon_i. \quad (5)$$

Whether government supported entrepreneurship will be on average lower or higher ability is not ex ante evident. There could be negative selection if the market correctly screens entrepreneurs, so that those who can start business only through government support are on average low ability and contribute less to growth. On the other hand, there could be positive selection, given that the application to get federally guaranteed loans is an arduous process. A potential entrepreneur has to navigate through the bureaucracy of the SBA and banks to secure a loan and may hence be an individual of high ability and contribute more to growth. Finally, in assessing government-backed entrepreneurship and market entrepreneurship one would need to know whether government-backed entrepreneurship complements or crowds out market entrepreneurship.

3. Data and Variables

To examine these questions, I construct a city level panel of MSAs in the United States from 1993 to 2002. The information on the births of establishments comes from the publicly available Statistics of U.S. Businesses (SUSB) Employment Change Data. Birth of establishments is stratified into three categories based on the *firm's size*, i.e., firms with 19 or less employees, 20-499 employees, and 500 employees or above. Any establishment births that appear in the 20-499 or 500 or above category are expansions by existing firms. For instance, an opening of a small establishment that is part of a large firm (e.g., a new Starbucks store) will appear in the 500 or above category. This paper does not consider expansion by large firms as entrepreneurship. Since a new firm starts with zero employee, all new firm creation appears only in the 19 or less category. New establishments created as an expansion by small firms (19 or less employees) if any, is also included in this category. I denote this category *small business birth*. This birth measure will be my main proxy for entrepreneurship. The SUSB Employment Change Data also provides the number of initial establishments for each MSA. The SUSB Annual Data provides static accounts of each MSA, including employment, annual payroll which includes all forms of compensations, such as salaries, wages, benefits, and bonuses. I will refer to annual

payroll and income interchangeably. The population data comes from information collected from the Census Bureau. I use the Federal Housing Finance Agency's House Price Index (HPI) to control for MSA level housing price. HPI is a measure of single-family house prices based on the average price change in repeat sales or refinancing of the same properties. Among the 329 MSAs in the 1993 to 2002 census data, I drop Anchorage, Honolulu and MSAs that have missing information. I eventually end up with a balanced panel of 316 MSAs. All analysis is performed on this set of metropolitan areas.

Data on the universe of Small Business Administration loans that were approved between 1985 and 2012 were purchased from Coleman Publishing. The data set contains a rich set of information including the loan amount, loan date, business location, lender, number of employees, and whether the loan was to a new business or existing business. I use these information to create MSA level aggregate variables. I identify each loan approval for a new business as an incidence of government-backed entrepreneurship. I then aggregate the count and approval amount of each incidence to generate MSA level entrepreneurship variables. Though the information provided in the data is quite comprehensive it does have some miscodes and missing information, particularly pertaining to the business location. I match the loan data to the MSA level census data based on the place name and zip code if available. The loans were first matched to a county and then linked to an MSA.[2]

The timing of birth variables warrants further explanation. The static variables in the SUSB data are for March or first quarter of each year. The birth variables count establishment births that occurred between March of the previous year and March of the reference year. Initial establishment level is the number of establishments in March of the previous year. For example, birth of establishment number for 1993 is the number of establishment births that occurred between March 1992 and March 1993. The initial establishment number for 1993 is the number of establishments that existed as of March 1992. The SBA loan data follows a fiscal year. Hence, the number of SBA loans and the approved amount for 1993 are the aggregate values for all loans approved in FY1993, i.e., July 1992 - June 1993.

Table 1 presents the summary statistics of the main variables used in the analysis. Employment growth during the ten year period is about 16 percent, which translates to an

[2] Some of the loan data had missing reports and miscodes. In the end I was able to match 93% of the data to a county, which were in turn matched to MSAs.

annualized growth rate of about 1.5 percent. The descriptive statistics indicate that small businesses are responsible for 73% of urban establishments but only 19% of urban employment. On average each metropolitan area saw a birth of 1387 small establishments where 13 of these were government supported entrepreneurship. Small businesses accounted for 83.6% of all establishment births.

4. The Impact of Entrepreneurship on Urban Growth

4.1. OLS Results

I begin the analysis by visually examining the relationship between entrepreneurship and urban employment growth. Figure 1A presents a scatterplot between the change in log MSA employment between 1993 and 2002 and the log small business birth in 1993. Figure 1B presents a similar plot for MSA income growth. A general upward sloping trend is observed. A higher share of small establishment birth is positively correlated with urban growth. I examine this relationship more formally in an econometric framework. Table 2 Panel A presents the OLS results as specified in equation (4) where the dependent variables are employment or income growth in 1993-2002. Panel B and Panel C present corresponding results for the 5 year windows of 1993-1998 and 1997-2002. The main variable of interest is log small business birth, my main proxy for entrepreneurship. I also include the impact of log establishment births by medium (20 to 499 employees) and large (500 or more employees) firms as controls. The birth of establishments by the larger firms represents an expansion of existing firms and does not capture any new entrepreneurship. In addition to the three birth variables, all specifications in Table 1 control for initial number of establishments in 1992, employment, annual payroll, population, and house price index in 1993, and the nine census division dummies.

Column (1) of Panel A indicates that a 10% increase in small business birth is associated with a 1.9 percent higher employment after 10 years. The contribution of establishment births by expansion of larger firms on employment growth is considerably smaller. The coefficient estimate on establishment births by medium sized firm is statistically indistinguishable from zero at standard levels. The column (1) results in Panel B and C mirror the Panel A results. The birth of small businesses contributes to urban growth at two to threefold higher rates than establishment expansions by larger firms. Columns (2) to (4) examine the birth effects separately by size. The coefficient estimates are slightly larger than the column (1) results, indicating that

establishment births are correlated across the different size categories. Focusing on the small business birth results in column (2), a 10 percent increase in entrepreneurship is associated with an annualized employment growth rate of about 0.2 percent in Panel A, 0.25 percent in Panel B, and 0.32 percent in Panel C. Columns (5) to (8) present results where the dependent variable is the growth of total income in the metropolitan area. The relative magnitude of the coefficient estimates across the different establishment size categories exhibit a similar pattern as in columns (1) to (4). However, the magnitudes are considerably larger. Focusing on the results in Panel A column (6), a 10 percent increase in small establishment birth is associated with 3.5 percent higher income after 10 years, which translates to an annualized income growth rate of about 0.34. The annualized growth rates in Panel B and C column (6) translate to about 0.4 percent and 0.5 percent. The larger coefficient estimates on entrepreneurship for income growth than that for employment growth indicates that per capita income in MSAs increases with entrepreneurship, which is consistent with an upper sloping labor supply assumed in Section 2. The fact that the annualized growth rates for the five year periods are higher than for the ten year period is consistent with faster growth of businesses when they are young as documented by Haltwinger et al (2013).

Table 2 depicts an equilibrium relation rather than a causal interpretation of entrepreneurship on urban growth. Unobserved factors that increase a city's growth potential would increase urban entrepreneurial activity as well as actual growth. Such omitted variable would render the OLS coefficient estimates on entrepreneurship biased. To alleviate some of the concerns that arise in the cross-sectional analysis of Table 2, I present first difference estimates in Table 3 based on the following model:

$$\Delta \ln Y_{i,1997-2002} - \Delta \ln Y_{i,1993-1998} = \beta \Delta \ln e_{i,1993-1997} + \Delta \ln X_{i,1993-1997} \cdot \gamma + \varepsilon_{i,1993-1997}. \quad (6)$$

This specification essentially differences the Table 2 Panel C variables from the Table 2 Panel B variables and runs an OLS estimation. The first differencing would deal with unobserved constant MSA fixed effects, such as static metropolitan area growth potentials. However, in the above five year dynamic framework, first differencing mechanically introduces endogeneity if the error terms are correlated over time, a very likely scenario. Hence, one should examine the Table 3 estimates with such concern in mind.

For both the employment growth results in Panel A and the income growth results in Panel B, the coefficient estimates in general become smaller than those observed in Table 2

Panels B and C and are always smaller than the average coefficient estimates of Table 2 Panels B and C. Dealing with unobserved MSA level static growth potential by first differencing seems to have mitigated the omitted variable bias in Table 2. Now, the coefficient estimates on the establishment birth by larger firms are no longer significant and only the coefficient estimates for entrepreneurship, i.e. small business births, remain significant. Focusing on the column (2) results, a 10 percent increase in small business birth is associated with an annualized employment growth rate of 0.25 percent and an annualized income growth rate of 0.28 percent. The higher income growth as in the previous table implies that per capita income in cities increase with entrepreneurship.

4.2 Homestead Exemption Levels as Instrumental Variables and 2SLS Results

If there are unobserved time varying MSA level growth potentials which are correlated with MSA entrepreneurship, then dealing with MSA fixed effects will not be sufficient. For example, if potential entrepreneurs perceive that in 1993 that a city will be increasingly favorable for growth and start businesses then the endogeneity concern remains. To deal with these potential problems, I also estimate the impact of entrepreneurship on urban growth using the homestead exemption levels in 1975 as instrumental variables. When a non-incorporated business is no longer financially viable, the debt of the business becomes personal liability of the business owner and he or she can file for personal bankruptcy.[3] However, in these unfortunate instances property exemption laws in the US have protected a part of the debtor's assets. Such property exemption has existed in the US since 1845 when Texas became a US state, and by 1898 people could file for bankruptcy under a federal bankruptcy law and receive protection according to each state's homestead exemption level (Posner et al. 2001). Homestead exemption protects ownership on real property, such as house or land, up to the specified level. If an entrepreneur owns $50,000 equity in a house and files for bankruptcy in a state where the homestead exemption level is $20,000, the entrepreneur would keep $20,000 and the rest would go to the (unsecured) creditors.

[3] Over 70% of small businesses are sole proprietors. Partnerships are also unincorporated and hence are eligible for personal bankruptcy procedures. Limited liability companies and corporations limit the financial liability of the owner or shareholder.
http://www.sba.gov/community/blogs/top-10-questions-about-small-business-incorporation-answered

As Table 4 indicates the homestead exemption levels in 1975 were set by each state and varies significantly across states. The exemption levels ranged from zero in Connecticut, Delaware, Maryland, New jersey, Ohio, Pennsylvania, Rhode Island, and West Virginia to unlimited in Arkansas, Florida, Iowa, Kansas, Minnesota, Oklahoma, South Dakota and Texas. An entrepreneur filing for bankruptcy in Iowa could keep his or her home and land in entirety, where as one in Ohio would have lost his house if debt was greater than equity in his house. Given that there are unlimited exemption levels, I cannot simply use the continuous exemption level as the instrumental variable. Hence, I first construct two state exemption level variables: UN_s, a dummy equal to one if the state has unlimited exemption and equal to zero if the state has limited or no exemption, and EX_s, the state exemption level. EX_s is set to zero for states with unlimited exemption. For MSAs not contained entirely within one state, I average each variable across the states each MSA overlaps with. Hence, the final set of MSA level instrumental variables are:

$$UN_i = \frac{1}{N[s \in i\}} \sum_{s \in i} UN_s, \;\; lnEX_i = \log(\frac{1}{N[s \in i\}} \sum_{s \in i} EX_s + 1). \quad (7)$$

where *i* indexes for MSAs and *s* for states. Two conditions are needed for the above set of homestead exemption level variables to serve as a valid instrument for entrepreneurship in equation (4). The first is that exemption levels need to impact entrepreneurship. The literature provides direct evidence on this relationship. Fan and White (2003) discuss how higher exemption levels serve as a wealth insurance and induce risk averse potential entrepreneurs to start a business. They empirically confirm this using household level data. I will find strong evidence of this correlation at the aggregate level in my data as well.

The second condition, that conditional on city economic conditions in 1993, the 1975 homestead exemption level impacts 1993-2002 urban growth only through its impact on entrepreneurship warrants further understanding of the variance in exemption levels across states. What explains the astonishingly wide variance in exemption levels? As Posner et al. (2001) points out, hypotheses relating the difference in the demand for insurance, or in altruism are unlikely to explain such wide variance. They examine the cross sectional variation in homestead exemption level in a regression framework by including multiple variables, such as income, charitable giving, population density, farm proprietors share, and find that only the historical exemption levels in 1920 predict current exemption levels. Their argument that (1) initially sparsely populated states in the 1800s set high homestead exemption levels to compete for

migrants and that (2) whenever state lawmakers would negotiate the exemption level the bargaining point would be the then current levels provides a convincing explanation of the persistent variation of exemption level across states. The assumption for instrument exogeneity holds if unobserved MSA level static and dynamic growth potential between 1993-2002, controlling for 1993 economic conditions and entrepreneurship, is not correlated with the homestead exemption levels in 1975 which have its origins dating back to the 19th century.

Table 5 Panel A presents the first stage of the 2SLS estimation. The estimation in practice is identical to equation (4) where the entrepreneurship variable is instrumented with the homestead exemption variables in equation (7). All specifications include the initial control variables and Census division dummies. Column (1) examines the impact of the unlimited exemption variable on the birth of small businesses. Small business birth is about 15.3 percent higher in metropolitan areas with unlimited exemption versus not. Column (2) adds the continuous log exemption level variable. The impact of the homestead exemption level is statistically significant at the 1 percent level but the magnitude is small. A doubling of the exemption level increases small establishment birth by 0.65%. Overall, the results indicate that higher exemption level increases entrepreneurship. Columns (3) and (4) examine the impact of homestead exemption on medium and large firm expansion, i.e., branch openings by existing firms. The unlimited exemption variable is statistically indistinguishable from zero in both columns. The statistical power of the log exemption level variable drops significantly and is not significant at the 5% level.

Table 5 Panel B and C present the 2SLS results on employment growth and income growth using the homestead exemption variables as instruments. Columns (1) and (2) use only the unlimited exemption variable as an instrument and Columns (3) and (4) use both variables in the instrument set. Depending on the specification, 10% more small business birth in 1993 leads to 1~1.5% more employment and 2.5~3.5% more total payroll after 10 years. The 2SLS estimates for employment growth are 40 to 50% smaller in magnitude relative to the OLS estimate in Table 2 indicating that the instrumental variable estimates substantially corrected for potential omitted variables.

Note that the 2SLS estimates implicitly assume that the variation in the homestead exemption levels impacts the number of births but not the average entrepreneurial ability in each MSA. However, it is unlikely to be the case. Consider a distribution of entrepreneurial ability in

a city. If homestead exemption serves as a wealth insurance as in Fan and White (2003), cities with higher exemption will see more new businesses. Depending on whether the marginal entrepreneur's entrepreneurial ability is greater or lower than the existing average entrepreneurial ability in the city, the 2SLS estimate on the number of entrepreneurship may over or understate the true impact. If higher homestead exemption renders the marginal entrepreneur to be of lower ability than the average, the 2SLS estimates we get in Table 4 is likely a lower bound. On the other hand, if higher homestead exemption renders the marginal entrepreneur to be of higher ability than the average, the 2SLS estimates we get in Table 4 are likely to be larger than the true impact.[4] I do not have data to test which situation is likely to be the case. However, if we assume a model where the decision to become an entrepreneur is non-decreasing in wealth and entrepreneurial ability, and that the additional wealth insurance from higher homestead exemption levels mostly impacts the contribution of wealth on start-up decision, then the marginal entrepreneur's ability would be lower than the average.[5] This would imply that the 2SLS estimates in Table 4 are lower bounds.

4.3 The Agglomeration Benefits of Entrepreneurship

The OLS, first difference, and instrumental variable estimates all indicate that entrepreneurship contributes to urban growth. In this section, I examine whether the growth impact of entrepreneurship is simply due to the growth in the newly created businesses or whether there is agglomeration benefit. i.e., growth associated with other firms in the economy.

[4] Note that this argument assumes a closed city or that all cities are identical. If entrepreneurs of different ability sort across cities to take advantage of higher homestead exemption, one would need to consider whether there is positive or negative selection across cities as well. I abstract away from this discussion. However, there is evidence that entrepreneurs disproportionately start their businesses in their hometowns (Michelacci and Silva, 2007).

[5] Suppose a potential entrepreneur's decision to start a business depends on the individual's wealth w and entrepreneurial ability a. Further assume that wealth w and entrepreneurial ability a are uniformly distributed across a two-dimensional space. I assume that the decision to become an entrepreneur is non-decreasing in wealth w and entrepreneurial ability a. Wealth captures both collateral used to start a business, as well as risk preference, so that higher w will imply a higher propensity to start a business. Higher entrepreneurial ability will also imply a higher propensity to start a business. Given w and a there will be an expected payoff for entrepreneurship and working for others. If the expected payoff of entrepreneurship is greater than the wage earnings, one will start a business. In other words, one can think of a simple decision rule that can be expressed as below:

$$D_{entrepreneur} = 1, \quad if\ \tau w + \varphi a \geq c$$
$$D_{entrepreneur} = 0, \quad if\ \tau w + \varphi a < c$$

for some parameters τ and φ and cutoff c. $D_{entrepreneur}$ equals one for an entrepreneur and zero if one works for another. Depending on how higher exemption level might impact the relative importance of the two factors, i.e., the ratio τ/φ, the average ability of observed entrepreneurs in the metropolitan area will differ. If higher exemption serves as a wealth insurance and increases the relative importance of wealth, i.e., τ/φ increases, then average ability $E(a)$ in the city will decrease.

A 10 percent increase in small establishment birth in 1993 translates to about 139 more births at the mean. Using the preferred 2SLS estimates this will generate about 1 to 1.5 % more employment ten years later which amounts to 2,521 to 3,782 more jobs. The Bureau of Labor Statistics reports that about a third of new establishments survive after 10 years.[6] If I assume all of the employment increase came from the new businesses created in 1993 it would imply that on average each surviving business increased employment by 54 to 82. Unfortunately, I could not find information on the average growth of new businesses that survive after 10 years and hence cannot make a direct comparison. However, in the 1992-1993 period, there were 564,504 firm births in the less than 20 employee category, which in aggregate created 3,438,106 employment in the U.S. This returns on average 6.1 employment per new small business created in 1993. If the average new business that survives after ten years is unlikely to grow from 6.1 employees to 54 to 82 employees, the results here imply substantial agglomeration benefits from entrepreneurship.

Examining the income growth provides a clearer picture of the agglomeration benefits of entrepreneurship. A 10 percent increase in entrepreneurship causes 2.5 to 3.5% higher income after 10 years, which translates to $163,843,500 to $229,380,900. If this was distributed solely to the newly created employment (using the average of 3,152) each individual would get an annual pay of $51,980 to $72,773. If we use the lower bound estimates for both employment and income growth each individual would get an annual pay of $64,991. Given that average pay for employees working in small establishments in 2002 was $30,004 ($617,583,597,000/20,583,371 employees) the estimated agglomeration benefit of entrepreneurship seems substantial.

5. The Impact of Government-backed Entrepreneurship on Urban Growth

5.1 Background on Small Business Loans

Given the finding that entrepreneurship contributes significantly to urban economic growth, I next ask how the federal government's effort to promote entrepreneurship fare for economic growth. The US government established the Small Business Association (SBA) in 1953 to promote the creation and expansion of small businesses and has since served as the advocacy agency, provided guidance, and financially supported small businesses. The fact that there is government intervention implicitly implies that there is market failure in the small

[6] http://www.sba.gov/advocacy/7495/29581

business loan market, i.e., capable potential entrepreneurs are unable to start or expand a business because of imperfect information, missing insurance markets, or discrimination. Commercial lenders are unwilling to lend to potential entrepreneurs without sufficient collateral, may not be able to properly assess the feasibility of businesses, or may discriminate against female or minority entrepreneurs. Because of such likely market imperfections, the SBA promotes entrepreneurship by guaranteeing loans provided through commercial lenders and taking over the debt in case the debtor defaults.

The SBA's main form of guaranteed lending is the Small Business Loan, also known as the 7(a) loan program.[7] The Small Business Loan (SBL) is based on Section 7(a) of the Small Business Act and is provided by commercial lenders that structure loans according to SBA's guidelines and receive a guarantee from the SBA. The SBA usually guarantees up to 85% of the loan. The commercial lender is in charge of the process and the loan applicant must meet the commercial lender's criteria. The applicant and the commercial lender negotiate the loan term subject to the SBA requirements and the applicant must meet the SBA's firm size requirements and be for-profit. The purpose of this study is not to assess whether there is market failure in the small business lending market but to examine whether entrepreneurship supported by the SBA differ from market entrepreneurship in its contribution to urban economic growth. Ex ante, it is difficult to assess whether there is positive selection or negative selection in SBA supported entrepreneurship. If the SBA guarantee draws in entrepreneurs that were not only credit constrained but also of lower entrepreneurial ability there could be negative selection into government backed entrepreneurship. If high ability entrepreneurs were shun from the commercial lending, SBA guaranteed lending could create positive selection. Also, the complexity and the bureaucracy associated with the application process itself could generate positive selection. Hence, this is a question that needs to be assessed empirically. The variables used to measure SBA guaranteed entrepreneurship in an MSA are (1) the number of SBA loans

[7] There also is the Certified Development Company Loan, also known as the 504 loan program. The Certified Development Company (CDC) loan provides financing for fixed assets, such as, land, buildings, or machines, through a certified development company. A certified development company is a non-profit corporation set up to promote local economic development with several hundred locations nationwide. An important difference is that the CDC is only available to existing small businesses that plan to expand its business and cannot be used to start a new business and hence is not subject of interest in this study. The loan portfolio is such that typically the applicant contributes 10% of the total cost, the commercial lender 50%, and the CDC 40% which is fully guaranteed by the SBA.

approved to new businesses, and (2) the total dollar amount of SBA loans approved to new businesses. Descriptive statistics of these variables appear in Table 1.

5.2. The Impact of Government Backed Entrepreneurship on Urban Economic Growth

Table 6 Panel A reports the OLS results. Estimation is based on equation (4) where the entrepreneurship variables are replaced by the SBA loan variables. All specifications include the initial year controls and the census division dummies. The cross-sectional analysis on employment in columns (1) and (2) indicates that more government backed entrepreneurship measured by the number of loans approved to new businesses results in higher employment growth. However, the approved dollar amount has no significant impact on employment growth with coefficient estimates that are negative.[8] Getting more entrepreneurs started seems to be more important for growth than giving out larger loans. When loan amount is not controlled for in column (2) the coefficient estimate on the number of loans is no longer significant. The total income results in columns (3) and (4) are statistically weaker in general and the negative impact of total loan amount is more pronounced in column (3). The fact that the magnitudes of the coefficient estimates for income in columns (3) and (4) are smaller than those for employment in columns (1) and (2) indicates that more SBA loans are associated with lower per capita income growth. This is in contrast with the results in the previous section, which showed that small business births increase per capita income growth.

The cross-sectional analysis likely suffers from endogenous SBA loan application and approval that relates to unobserved city characteristics. Table 6 Panel B presents first difference estimates, which controls for the MSA fixed effect at the cost of introducing the potential for endogeneity through correlated error terms. All estimates are no longer statistically significantly different from zero at standard levels. The OLS and first-difference results suggest that a larger number of SBA loans were approved in cities that were growing, but a larger amount of SBA loans were approved in cities that were declining.

Table 7 further examines the impact of government guaranteed entrepreneurship using instrumental variables. I focus on the impact of the number of SBA loans approved to new businesses in 1993 on MSA growth. I introduce a couple more instruments to generate plausibly

[8] Samila and Sorenson (2011) also find that the number of firms receiving loans matter for growth but not the total amount when examining the impact of venture capital. The number of entrepreneurship seems to be driving force of growth and getting entrepreneurs off the ground is more important than giving out big loans.

exogenous variation in SBA guaranteed loans: the number of SBA lender per capita in the metropolitan area in 1985, and years since interstate banking was deregulated in each metropolitan area. Table 7 Panel A presents the first stage results of the 2SLS estimation, i.e., the impact of the instrumental variables on the number of SBA loans approved for new small businesses in 1993. All specifications in Table 7 control for the initial economic conditions and census division dummies. Column (1) indicates that the number of SBA lender per capita in 1985 strongly predicts the number of SBA guaranteed loans to new business in 1993. The idea behind this is that cities that have higher competition among lenders will likely give out more loans. The validity of the instrument relies on the assumption that the number of loans given out in 1993 conditional on MSA employment, establishment, income, population, housing price in 1993 is related to the density of SBA lenders in 1985 but not to unobserved demand factors determining urban growth between 1993-2002.

Column (2) uses years since interstate banking deregulation as an instrument. Banks in the U.S. were severely restricted in their ability to branch within and across state borders during most of the 20th century. Such restrictions were based on the concern that large concentrated banks would help the wealthy at the cost of the poor (Beck et al. 2010). Only in recent decades did states start to permit banks to open new branch within state (intrastate branching) and out of state (interstate branching), and by 1994 all restrictions were lifted with the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act. Table 4 lists the years each state deregulated interstate banking. I use years since interstate branching deregulation in 1993 (1993-deregulation year) as an instrumental variable. For MSAs that overlap with multiple states, I use the average years across the overlapping states. The main intuition behind the instrument is that MSAs that deregulated interstate branching earlier would see more competition for commercial lending in 1993. This in turn would reduce the need for marginal entrepreneurs to go through the bureaucracy of the SBA to get loans. Column (2) confirms this relationship. The longer it has been since deregulation the lower is SBA backed entrepreneurship in 1993. The validity of this instrument hinges on the assumption that the timing of deregulation was more or less idiosyncratic and unrelated to the growth potential of cities between 1993 and 2002. Several studies have found the timing of deregulation to be unrelated to state economic conditions. (Beck et al. 2010). Column (3) illustrates the first stage when both instruments are used. In column (4), I add the set of homestead exemption level instruments used in the previous section.

Table 7 Panels B and C report the 2SLS results on employment and income. For each column the instrumental variables are the variables reported in Panel A. Whichever instrumental variables I use, the estimated impact of government guaranteed entrepreneurship on either urban employment or income growth is statistically indistinguishable from zero at standard levels. The first stage F-statistic is generally quite strong, and when multiple instruments are used the over-identification test results pass the first cut for instrument exogeneity.

Table 8 directly compares the impact of market entrepreneurship versus government backed entrepreneurship on urban economic growth. Since the establishment birth variables used in the previous section is the universe of births, I subtract the number of SBA guaranteed loans to new businesses from the number of small business birth to get the number of market entrepreneurship. All specifications control for initial economic conditions and the census division dummies. Columns (1) and (2) report the OLS results on employment and income growth. The coefficient estimate on market entrepreneurship is nearly identical to the estimates in Table 2 columns (2) and (6). However, the coefficient estimates on government-backed entrepreneurship in column (1) drops to 0.009 from 0.011 in Table 6 column (2). The coefficient estimate in column (2) exhibits an even larger drop to 0.002 from 0.005 in Table 6 column (4). Once I control for market entrepreneurship, the impact of government-backed entrepreneurship weakens further and is not statistically significant. I estimate the same specification using 2SLS using all four instruments. Columns (3) and (4) report the first stage and list the instruments used. Note that the instruments generally impact market entrepreneurship versus government-backed entrepreneurship in opposite directions. As I discussed with the deregulation instrument, a lending environment helpful for market entrepreneurship decreases the potential entrepreneur's need to seek government help and in turn suppresses government-backed entrepreneurship. Columns (5) and (6) report the 2SLS results using all four instrumental variables. The first stage F-statistics is 7.215 and the over-identification test reports large p-values. Similar to the OLS results in columns (1) and (2), there is no impact of government backed entrepreneurship on urban economic growth. The coefficient estimates on market entrepreneurship is 0.104 for employment growth and 0.326 for income growth, which are quite similar to the 2SLS estimates reported in Table 5.

5.3 Does government backed entrepreneurship crowd out market entrepreneurship?

Given that market entrepreneurship promotes urban employment and income growth and that government backed entrepreneurship has no impact, I further examine whether government backed entrepreneurship simply supplements market entrepreneurship or whether there is crowd out of market entrepreneurship because of government-backed entrepreneurship. Table 9 examines this relationship. In practice I run the following panel regression:

$$\ln mrktent_{i,t} = \beta \ln govtent_{i,t} + \ln X_{i,t} \cdot \gamma + \mu_i + \eta_t + \varepsilon_{i,t} \qquad (8)$$

where $\ln govtent_{i,t}$ is the log number of SBA guaranteed loans to new businesses and $\ln mrktent_{i,t}$ is the log number of market entrepreneurship, i.e., the number of small business births minus the number of SBA loans to new businesses. $X_{i,t}$ is the set of the employment, establishment, payroll, and housing price index numbers, η_t is the vector of year fixed effects, and μ_i is the vector of MSA fixed effects. Column (1) estimates the above equation excluding the MSA fixed effects. I find a positive relationship between government and market entrepreneurship. However, once I control for MSA fixed effects and look within MSAs over time the relation becomes negative and statistically significant. Government-backed entrepreneurship crowds out market entrepreneurship. A doubling of SBA loans to new small businesses decreases market entrepreneurship by 0.89 percent. Using the averages in 1993, this implies that increasing the number of SBA loans to new businesses by 13 will decrease market entrepreneurship by 12. There is a near one to one crowd out. The results imply that government-backed entrepreneurship replaces market entrepreneurship one to one but in itself has no positive impact on economic growth. Based on the crowd out result and the *average* impact of entrepreneurship, one could conclude that government-backed entrepreneurship actually interferes with urban economic growth.

However, entrepreneurial ability is heterogeneous and the contribution of each entrepreneur to urban economic growth also very heterogeneous. What matters is whether the SBA loans were crowding out the high ability or low ability market entrepreneurs. One way to assess this is to compare the estimates that include all entrepreneurs in Table 5 and when we separate out the type of entrepreneurs in Table 8. The story can go both ways depending on the estimate one uses. The drop from 0.155 in Table 5 Panel B Column (2) to 0.104 in Table 8 Column (5) would indicate that the SBA loans were crowding out the high ability market entrepreneurs. However, the two estimates are statistically not different. If one uses the Table 5

Panel B Column (4) estimate than we see almost no difference, implying that the SBA loan crowded out low ability entrepreneurs who would have not have contributed to economic growth anyways. Currently, coefficients estimates are not statistically different among each other and one would not be able to claim that the high ability entrepreneurs are being crowded out just based on the evidence using this data.

Lastly, the above results only examine the implications for economic efficiency and growth. Even though an economic growth argument would oppose government intervention in small business entrepreneurship based on this paper's results, I have not examined any distributional implications or potential discrimination justifying market intervention. A more complete assessment of government-backed entrepreneurship would require careful examination relating to equity concerns, a future area of research, in addition to the efficiency results found in this paper.

6. Conclusion

Entrepreneurship is widely believed to be a main source of economic growth. This paper estimated the impact of entrepreneurship measured by the birth of businesses on urban employment and income growth, and examined how entrepreneurship supported by government guaranteed loans compare with market entrepreneurship in relation to its impact on urban growth. I also examine whether government-backed entrepreneurship complements or crowd outs market entrepreneurship. The study of entrepreneurship and urban growth has been hampered by the joint determination of the two. I use the variation in entrepreneurship generated by the homestead exemption levels in state bankruptcy laws to examine urban growth between 1993 and 2002. I find that a ten percent increase in the birth of small businesses increases MSA employment by 1 to 1.5% and income by 2.5 to 3.5% after ten years. I next examine whether the Small Business Loan programs that guarantee loans to entrepreneurs unable to finance through the market generate urban growth. I find no growth impact from government-backed entrepreneurship and further find that government-backed entrepreneurship crowds out market entrepreneurship one to one. In sum, market entrepreneurship promotes urban employment and income but government-backed entrepreneurship does not.

While the results of this paper indicate that promoting government-backed entrepreneurship would be flawed based on efficiency arguments, equity and distributional

concerns remain. The main rationale for government intervention is market failure in the small business lending market, and particularly of discrimination. A substantial literature has documented discrimination in the home mortgage lending market (Ladd 1998) and the employment market (Bertrand and Mullainathan 2004, Oreopoulos 2009). Discrimination may be prevalent in the small business loan market as well. The SBA reports that the share of female and minority entrepreneurs are smaller relative to the overall economy and many state economic development agencies and the federal Minority Business Development Agency provide assistance to female and minority entrepreneurs. Commercial lenders are unwilling to lend to potential entrepreneurs without sufficient collateral. This may imply that on average we will see less entrepreneurship in demographics with lower wealth. However, in addition to statistical discrimination there maybe preference based discrimination against female or minority entrepreneurs. Further examination on the extent and impact of such discrimination is needed for a complete assessment of government-backed entrepreneurship.

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Figure 1. Scatterplot between urban employment growth (1993-2002) and small business births (1993).

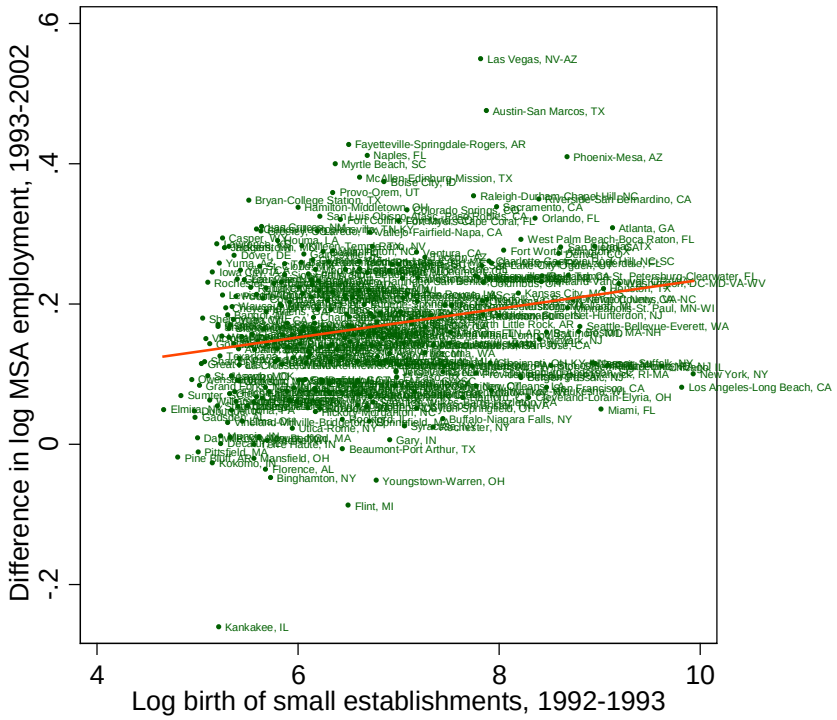

Figure 2. Scatterplot between urban income growth (1993-2002) and small business births (1993).

Table 1. Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Change in log employment, 1993-2002	0.163	0.100	-0.261	0.550
Change in log annual payroll, 1993-2002	0.473	0.139	0.046	0.967
Employment, 1993	252130	439654	20957	3495130
Annual payroll ($1,000), 1993	6553740	13300000	335607	123000000
Employment of establishments with less than 20 employees, 1993.3	48003	79320.2	5317	644273
Employment of establishments with 20 to 499 employees, 1993.3	82163	144312.4	6868	1203297
Employment of establishments with more than 499 employees, 1993.3	121963	217507.3	6870	1666884
Number establishments with less than 20 employees, 1993.3	11856	20298.56	1234	180540
Number of establishments with 20 to 499 employees, 1993.3	2357	3774.05	245	31251
Number of establishments with more than 499 employees, 1993.3	1999	3107.24	213	22605
Birth of establishments by new firms or firms with less than 20 employees, 1992.3-1993.3	1387	2390.85	105	20602
Birth of establishments by new firms of firms with 20 to 499 employees, 1992.3-1993.3	119	201.29	6	1771
Birth of establishments by firms with more than 499 employees, 1992.3-1993.3	153	254.10	8	1866
Amount of SBA loans approved($1,000), FY1993	18400	30600	86	307000
Amount of SBA loans approved($1,000) for new businesses, FY1993	2809	4424	0	45700
Amount of SBA loans approved($1,000) for new businesses with less than 20 employees, FY1993	1823	2981	0	30500
Number of SBA loans approved, FY1993	68.6	101.97	1	879
Number of SBA loans approved for new businesses, FY1993	13.3	18.24	0	140
Number of SBA loans approved for new businesses with less than 20 employees, FY1993	11.7	16.44	0	130
Number of SBA lenders in 1985	4.7	6.55	0	54

Notes: Unit of analysis is the Metropolitan Statistical Area (MSA) and the number of MSAs in the data is 316.

Table 2. Impact of Entrepreneurship on Urban Growth: OLS Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Dependent variable:	*Change in log employment, 1993-2002*				*Change in log income, 1993-2002*			
Log small business births in 1992-1993	0.192***	0.218***			0.311***	0.347***		
	(0.0316)	(0.0331)			(0.0416)	(0.0415)		
Log establishment births by existing medium firms in 1992-1993	0.0319		0.0737***		0.0554*		0.119***	
	(0.0224)		(0.0242)		(0.0283)		(0.0319)	
Log establishment births by existing large firms in 1992-1993	0.0503***			0.0776***	0.0526**			0.0973***
	(0.0191)			(0.0204)	(0.0254)			(0.0267)
Log initial establishment in 1992	-0.166**	-0.146**	0.0709	0.0661	-0.284***	-0.259***	0.0846	0.0948
	(0.0727)	(0.0698)	(0.0590)	(0.0562)	(0.0855)	(0.0812)	(0.0731)	(0.0739)
Log employment in 1993	-0.0177	0.0482	-0.0881	-0.0733	0.0408	0.131	-0.0871	-0.0463
	(0.0890)	(0.0955)	(0.0892)	(0.0947)	(0.125)	(0.126)	(0.133)	(0.138)
Log annual payroll in 1993	-0.0603	-0.0819	-0.0340	-0.0456	-0.0887	-0.119	-0.0427	-0.0660
	(0.0511)	(0.0530)	(0.0526)	(0.0557)	(0.0806)	(0.0812)	(0.0864)	(0.0913)
Log population in 1993	-0.0188	-0.0246	-0.00239	-0.00516	-0.0601	-0.0684*	-0.0330	-0.0383
	(0.0321)	(0.0328)	(0.0359)	(0.0358)	(0.0409)	(0.0410)	(0.0472)	(0.0491)
Log housing price index 1993	0.0505	0.0986	-0.0339	-0.0698	0.0190	0.0767	-0.134	-0.176
	(0.116)	(0.121)	(0.129)	(0.129)	(0.141)	(0.144)	(0.158)	(0.160)
Census division fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
R squared	0.456	0.437	0.354	0.360	0.486	0.471	0.364	0.355

Notes: The unit of analysis is MSA and the number of observations is 316. Establishment births for 1993 are counted between March 1992 and March 1993. New firm creation appear in the "small business births" variable, my main proxy for entrepreneurship. This category may include expansion of small firms with less than 20 employees. The "establishment birth by existing medium firms" variable refers to expansion by firms with 20-499 employees. The "establishment birth by existing large firms" variable refers expansion by firms with over 500 employees. The nine census division dummies are included as controls. In columns (1) to (4) the dependent variable is the change in log total employment in the MSA between 1993 and 2002. In columns (1) to (4) the dependent variable is the change in log total annual income, which includes all wages, salary, bonuses, and benefits, in the MSA between 1993 and 2002. * p<0.1, ** p<0.05, *** p<0.01. Robust standard errors are in parentheses.

Table 2 continued. Impact of Entrepreneurship on Urban Economic Growth: OLS Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel B: Dependent variable:	*Change in log employment, 1993-1998*				*Change in log income, 1993-1998*			
Log small business births in 1992-1993	0.109***	0.133***			0.178***	0.205***		
	(0.0216)	(0.0220)			(0.0285)	(0.0284)		
Log establishment births by existing medium firms in 1992-1993	0.0417***		0.0656***		0.0476***		0.0842***	
	(0.0119)		(0.0134)		(0.0156)		(0.0186)	
Log establishment births by existing large firms in 1992-1993	0.0306**			0.0492***	0.0325*			0.0601***
	(0.0133)			(0.0136)	(0.0176)			(0.0173)
Panel C: Dependent variable:	*Change in log employment, 1997-2002*				*Change in log income, 1997-2002*			
Log small business births in 1996-1997	0.157***	0.175***			0.259***	0.270***		
	(0.0290)	(0.0279)			(0.0380)	(0.0356)		
Log establishment births by existing medium firms in 1996-1997	0.0682**		0.0949***		0.0422		0.0825***	
	(0.0279)		(0.0250)		(0.0349)		(0.0317)	
Log establishment births by existing large firms in 1996-1997	0.0133			0.0282*	0.0108			0.0230
	(0.0139)			(0.0157)	(0.0176)			(0.0200)
Other controls	Y	Y	Y	Y	Y	Y	Y	Y
Census division fixed effects	Y	Y	Y	Y	Y	Y	Y	Y

Notes: The unit of analysis is MSA and the number of observations is 316. Establishment births for 1993 are counted between March 1992 and March 1993. New firm creation appears in the "small business birth" variable, my main proxy for entrepreneurship. This category may include expansion of small firms with less than 20 employees. The "establishment birth by existing medium firms" variable refers to expansion by firms with 20-499 employees. The "establishment birth by existing large firms" variable refers to expansion by firms with over 500 employees. The initial control variables used in Panel A are all included in Panels B and C. The nine census division dummies are included as controls. Panel B examines the five year growth between 1993 and 1998. Panel C examines the five year growth between 1997 and 2002. In columns (1) to (4) the dependent variable is the change in log total employment in the MSA. In columns (5) to (8) the dependent variable is the change in log total annual income, which includes all wages, salary, bonuses, and benefits, in the MSA. * p<0.1, ** p<0.05, *** p<0.01. Robust standard errors are in parentheses.

Table 3. Impact of Entrepreneurship on Urban Economic Growth: First-difference Estimates

	(1)	(2)	(3)	(4)
Panel A: Dependent variable:	*Change in 5 year employment growth, (1997 to 2002 growth) - (1993 to 1998 growth)*			
ΔLog small business births between 1993 and 1997	0.131***	0.136***		
	(0.0327)	(0.0350)		
ΔLog establishment births by medium firms between 1993 and 1997	0.0334		0.0359	
	(0.0224)		(0.0232)	
ΔLog establishment births by large firms between 1993 and 1997	-0.00270			0.000924
	(0.0114)			(0.0118)
R-squared	0.570	0.558	0.549	0.536
Panel B: Dependent variable:	*Change in 5 year income growth, (1997 to 2002 growth) - (1993 to 1998 growth)*			
ΔLog small business births between 1993 and 1997	0.149***	0.149***		
	(0.0454)	(0.0458)		
ΔLog establishment births by medium firms between 1993 and 1997	0.0161		0.0189	
	(0.0244)		(0.0250)	
ΔLog establishment births by large firms between 1993 and 1997	-0.0103			-0.00648
	(0.0165)			(0.0168)
R-squared	0.529	0.527	0.512	0.510

Notes: The unit of analysis is MSA and the number of observations is 316. All columns include the change in initial establishment, employment, payroll, population, and house price index as control variables. Establishment births for year t are counted between March of year t-1 and March of year t. New firm creation appears in the "small business births" variable, my main proxy for entrepreneurship. This category may include expansion of small firms with less than 20 employees. The "establishment birth by existing medium firms" variable refers to expansions by firms with 20-499 employees. The "establishment birth by existing large firms" variable refers to expansions by firms with over 500 employees. In Panel A the dependent variable is the change in log total employment in the MSA. In Panel B the dependent variable is the change in log total annual income, which includes all wages, salary, bonuses, and benefits, in the MSA. * $p<0.1$, ** $p<0.05$, *** $p<0.01$. Robust standard errors are in parentheses.

Table 4. Homestead Exemption in 1975 and Year Interstate Banking was Permitted by State

State	Homestead exemption level in 1975	Year of interstate banking deregulation	State	Homestead exemption level in 1975	Year of interstate banking deregulation
AK	19,000	1987	MT	40,000	1993
AL	4,000	1982	NC	2,000	1990
AR	U	1986	ND	80,000	1985
AZ	15,000	1989	NE	8,000	1987
CA	20,000	1987	NH	5,000	1986
CO	15,000	1988	NJ	0	1989
CT	0	1983	NM	20,000	1982
DE	0	1988	NV	25,000	1985
DC	N/A	1985	NY	4,000	1991
FL	U	1985	OH	0	1985
GA	1,000	1985	OK	U	1987
HI	50,000	1995	OR	12,000	1986
IA	U	1985	PA	0	1986
ID	14,000	1986	RI	0	1984
IL	10,000	1986	SC	2,000	1986
IN	1,400	1991	SD	U	1988
KS	U	1992	TN	7,500	1985
KY	2,000	1984	TX	U	1987
LA	15,000	1987	UT	11,000	1984
MA	24,000	1978	VA	10,000	1988
MD	0	1985	VT	10,000	1985
ME	6,000	1983	WA	20,000	1987
MI	7,000	1986	WI	25,000	1988
MN	U	1986	WV	0	1987
MO	2,000	1988	WY	20,000	1987
MS	30,000	1986			

Notes: Exemption amounts are nominal and were collected from Posner et al. (2001). U denotes unlimited exemption. Exemption amount was not available for DC. Year of interstate branching collected from the St. Louis Fed publication at www.stlouisfed.org/publications/re/2007/b/pdf/dereg.pdf.

Table 5. Impact of Entrepreneurship on Urban Economic Growth: 2SLS Estimates

	(1)	(2)	(3)	(4)
Panel A - 1st Stage: Dependent variable:	*Log small business births in 1992-1993*	*Log small business births in 1992-1993*	*Log establishment births by medium firms in 1992-1993*	*Log establishment births by large firms in 1992-1993*
Log homestead exemption level in 1975		0.00942***	0.00884*	0.00926*
		(0.00354)	(0.00516)	(0.00503)
Unlimited exemption in 1975	0.153***	0.120***	0.0705	0.0571
	(0.0294)	(0.0308)	(0.0438)	(0.0514)
Controls	Y	Y	Y	Y
Census division fixed effects	Y	Y	Y	Y
R squared	0.982	0.983	0.961	0.960
Panel B - 2SLS : Dependent variable:	*Change in log employment, 1993-2002*			
Log small business births in 1992-1993	0.138**	0.155	0.131**	0.0978
	(0.0591)	(0.101)	(0.0591)	(0.0924)
Initial employment	Y	Y	Y	Y
Other Controls		Y		Y
Census division fixed effects	Y	Y	Y	Y
1st stage F-statistic	23.33	27.02	12.06	16.56
Hansen J-statistic p-value			0.3724	0.2566
Panel C - 2SLS : Dependent variable:	*Change in log income, 1993-2002*			
Log small business births in 1992-1993	0.235***	0.356**	0.238***	0.323**
	(0.0766)	(0.143)	(0.0769)	(0.130)
Initial payroll	Y	Y	Y	Y
Other Controls		Y		Y
Census division fixed effects	Y	Y	Y	Y
1st stage F-statistic	21.624	14.847	11.469	16.56
Hansen J-statistic p-value			0.8366	0.6384

Notes: The unit of analysis is MSA and the number of observations is 316. New firm creation appears in the "small business births" variable, my main proxy for entrepreneurship. This category may include expansion of small firms with less than 20 employees. In Panel A initial establishment, employment, payroll, population, and house price index as control variables. In Panels B and C, small business births for year 1993 are counted between March of 1992 and March of 1993. The Kleibergen-Paap rk Wald F statistics are reported as the 1st stage F-statistics in Panels B and C. "Other controls" in Panel B are the set of initial variables excluding initial employment. "Other controls" in Panel C are the set of initial variables excluding initial income. In Panel B the dependent variable is the change in log total employment in the MSA. In Panel C the dependent variable is the change in log total annual income, which includes all wages, salary, bonuses, and benefits, in the MSA. * p<0.1, ** p<0.05, *** p<0.01. Robust standard errors are in parentheses.

Table 6. Impact of Government-backed Entrepreneurship on Urban Economic Growth: OLS and First-difference Estimates

	(1)	(2)	(3)	(4)
Panel A: Dependent variable:	*Change in log employment, 1993-2002*		*Change in log income, 1993-2002*	
Log number of SBA loans approved for new businesses, FY1993	0.0215**	0.0109	0.0204	0.00510
	(0.0102)	(0.00732)	(0.0143)	(0.0101)
Log amount of SBA loans approved for new businesses, FY1993	-0.00323		-0.00469*	
	(0.00202)		(0.00266)	
Controls	Y	Y	Y	Y
Census division fixed effects	Y	Y	Y	Y
R squared	0.338	0.333	0.335	0.330
Panel B: Dependent variable:	*Change in 5 year employment growth, (1997 to 2002 growth) - (1993 to 1998 growth)*		*Change in 5 year income growth, (1997 to 2002 growth) - (1993 to 1998 growth)*	
ΔLog number of SBA loans approved for new businesses, 1993-97	0.00181	-0.000463	0.00623	0.00487
	(0.00508)	(0.00452)	(0.00729)	(0.00637)
ΔLog amount of SBA loans approved for new businesses, 1993-97	-0.000943		-0.000564	
	(0.00109)		(0.00140)	
Controls	Y	Y	Y	Y
R squared	0.537	0.536	0.511	0.511

Notes: The unit of analysis is MSA and the number of observations is 316. The number of new SBA loans approved and the total amount approved between July 1992 and June 1993 in each MSA are proxies for government-backed entrepreneurship. Panel A reports the OLS estimates for the employment and income growth regressions. Panel B reports the First-difference estimates. Panel A includes initial establishment, employment, payroll, population, house price index, and the census division dummies as control variables. Panel B includes the change in initial establishment, employment, payroll, population, and house price index as control variables. * p<0.1, ** p<0.05, *** p<0.01. Robust standard errors are in parentheses.

Table 7. Impact of Government-backed Entrepreneurship on Urban Economic Growth: 2SLS Estimates

	(1)	(2)	(3)	(4)
Panel A - 1st Stage: Dependent variable:	*Log number of SBA loans approved for new businesses, FY1993*			
Log number of SBA lender per capita in 1985	0.324***		0.312***	0.295***
	(0.0623)		(0.0624)	(0.0600)
Log years since interstate banking deregulation		-0.337***	-0.274**	-0.315***
		(0.123)	(0.119)	(0.120)
Log homestead exemption level in 1975				0.0394***
				(0.0137)
Unlimited exemption in 1975				-0.326**
				(0.146)
Controls	Y	Y	Y	Y
Division fixed effects	Y	Y	Y	Y
R squared	0.686	0.664	0.690	0.701
Panel B - 2SLS : Dependent variable:	*Change in log employment, 1993-2002*			
Log number of SBA loans approved for new businesses, FY1993	0.0156	-0.0678	0.00142	-0.0113
	(0.0274)	(0.0646)	(0.0259)	(0.0226)
Controls	Y	Y	Y	Y
Division fixed effects	Y	Y	Y	Y
1st stage F-statistic	27.07	7.556	18.768	11.181
Hansen J-statistic p-value			0.22	0.3228
Panel C - 2SLS : Dependent variable:	*Change in log income, 1993-2002*			
Log number of SBA loans approved for new businesses, FY1993	-0.0140	-0.0774	-0.0248	-0.0249
	(0.0378)	(0.0861)	(0.0356)	(0.0311)
Controls	Y	Y	Y	Y
Division fixed effects	Y	Y	Y	Y
1st stage F-statistic	27.07	7.556	18.768	11.181
Hansen J-statistic p-value			0.4915	0.1041

Notes: The unit of analysis is MSA and the number of observations is 316. The number of new SBA loans approved and the total amount approved between July 1992 and June 1993 in each MSA are proxies for government-backed entrepreneurship. All models include initial establishment, employment, payroll, population, house price index, and the census division dummies as control variables. Panel A reports the first stage estimates for the 2SLS regressions. The Kleibergen-Paap rk Wald F statistics are reported as the 1st stage F-statistics in Panels B and C. In Panel B the dependent variable is the change in log total employment in the MSA. In Panel C the dependent variable is the change in log total annual income, which includes all wages, salary, bonuses, and benefits, in the MSA. * p<0.1, ** p<0.05, *** p<0.01. Robust standard errors are in parentheses.

Table 8. Impact of Market versus Government-backed Entrepreneurship on Urban Economic Growth: OLS and 2SLS Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	*Change in log employment, 1993-2002*	*Change in log income, 1993-2002*	*Log number of SBA loans to new businesses*	*Log market entrepreneur-ship*	*Change in log employment, 1993-2002*	*Change in log income, 1993-2002*
Log number of SBA loans to new businesses	0.00917	0.00233			-0.00102	0.00712
	(0.00655)	(0.00878)			(0.0242)	(0.0329)
Log market entrepreneurship	0.213***	0.340***			0.104	0.326***
	(0.0327)	(0.0414)			(0.0883)	(0.124)
Log number of SBA lender per capita in 1985			0.295***	-0.0317*		
			(0.0600)	(0.0171)		
Log years since interstate banking deregulation			-0.315***	0.0766**		
			(0.120)	(0.0379)		
Log homestead exemption level in 1975			0.0394***	0.00815**		
			(0.0137)	(0.00370)		
Unlimited exemption in 1975			-0.326**	0.132***		
			(0.146)	(0.0295)		
Controls	Y	Y	Y	Y	Y	Y
Census division fixed effects	Y	Y	Y	Y	Y	Y
1st stage F-statistic					7.215	7.215
Hansen J-statistic p-value					0.2505	0.8431
R squared	0.439	0.47	0.701	0.983		

Notes: The unit of analysis is MSA and the number of observations is 316. Columns (1) and (2) are OLS estimates, columns (3) and (4) are first stage estimates of the 2SLS estimation in columns (5) and (6). The number of new SBA loans approved between July 1992 and June 1993 in each MSA proxy for government-backed entrepreneurship. Market entrepreneurship is defined as total small business birth minus the number of new SBA loans. All models include initial establishment, employment, payroll, population, house price index, and the census division dummies as control variables. The Kleibergen-Paap rk Wald F statistics are reported as the 1st stage F-statistics in columns (3) and (4). In columns (1) and (5) the dependent variable is the change in log total employment in the MSA. In columns (2) and (6) the dependent variable is the change in log total annual income, which includes all wages, salary, bonuses, and benefits, in the MSA. * p<0.1, ** p<0.05, *** p<0.01. Robust standard errors are in parentheses.

Table 9. Crowd Out of Market Entrepreneurship by Government-backed Entrepreneurship

	(1)	(2)
Dependent variable:	*Log market entrepreneurship*	*Log market entrepreneurship*
Log number of SBA loans to new businesses	0.00901	-0.0128***
	(0.00622)	(0.00364)
Control variables	Y	Y
Year fixed effects	Y	Y
MSA fixed effects		Y
Observations	3,223	3,223
R-squared	0.976	0.996

Notes: The unit of analysis is MSA year for 316 MSAs between 1993 and 2002. The number of new SBA loans approved between July 1992 and June 1993 in each MSA proxy for government-backed entrepreneurship. Market entrepreneurship is defined as total small business birth minus the number of new SBA loans. All models include establishment, employment, payroll, population, and house price index as control variables. * p<0.1, ** p<0.05, *** p<0.01. Robust standard errors are in parentheses.